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BOTANY.

Books for Young Collectors.—It is probable that the professional botantist too generally underrates the value of the books designed to aid the young collector. The untechnical and popular style rarely pleases the learned botanist, who long since passed beyond the need of such simple pabulum. But many a young man who is not able to go to college eagerly longs to make a beginning in the work of studying the plants about him, needing only some suggestions as to ways and means. For such a student the "books for young collectors" are most useful.

A recent book by T. S. Smithson, entitled "Pond-Life: Algæ and Allied Forms," is a good illustration of what such a work should be. In the introductory chapter some suggestions are given as to the apparatus required, with instructions as to collecting, etc. This is followed by a popular description of the more common fresh-water algæ, with suggestions as to their treatment. The earnest student can get much help from the book.

A Study of the Snow-Plant.—Professor Oliver, of London, has studied the "snow-plant" (*Sarcodes sanguinea*) of the Pacific coast, and published his results in the *Annals of Botany* for August. After a general description of the plant, the various parts are taken up in detail. The roots are very interesting, being "coralline" in appearance, and covered with a close-fitting sheath of fungal mycelium, constituting a well-marked case of "mycorhiza." The structure of this fungal layer is carefully worked out, and comparisons are made with the similar structure in Monotropa. It appears from these investigations that Sarcodes is not parasitic upon the roots of surrounding plants, but that it is a saprophyte, living upon decaying matter in the soil, in which it is aided by the layer of fungal mycelium.

The stem and leaves show the usual "reduced" condition common in parasites and saprophytes. The flower is essentially like that of Monotropa, with certain minor variations. The pollen shows the two nuclei, viz., the vegetative and the generative, with unusual clearness. The former is spherical, while the latter is spindle-shaped. In an earlier stage the pollen-spore is actually divided into two cells, some of the figures given closely resembling the pollen-spores of the Coniferæ.

The ovules arise as small upgrowths of tissue on the young placenta by the formation of tangential divisions in the layer immediately below the epidermis. At an early period the terminal cell of the hypodermal tissue of the young ovule is seen to be much larger than its neighbors, and is the "archesporium" from which by subsequent development the embryo-sac is to be formed. There is first cut off from the archesporium a single apical cell, and this is followed by another division, thus making a row of three cells, the lowermost of which is the embryo-sac. The latter enlarges and elongates, crowding the cap-cells until they are mere plates.

In the embryo-sac the nucleus divides, each part moving to an opposite extremity, where it divides again, and still again. At this stage there are four nuclei at each end of the embryo-sac. One of these at the micropylar end becomes the germ-cell (egg-cell, oösphere), two become the synergidæ, while the fourth moves downward, and, fusing with an ascending one from the opposite end, forms the nucleus of the first cell of the endosperm. After fertilization the germ-cell and endosperm-cell divide, forming embryo and endosperm.—CHARLES E. BESSEY.

The Annual Report of the State Botanist of New York.—This report from C. H. Peck, bearing date of December, 1889, contains much of interest to the technical botanist. Many new species of fungi are described and figured. Of these the majority are Agaricini, there being no less than eleven new species, belonging to seven different genera. Two new Myxomycetes are figured and described, viz., *Comatricha longa* and *C. subcæspitosa*. An interesting Plasmopara (*P. viburni*) is described as occurring on *Viburnum dentatum*. The author says that it is evidently very near to *P. viticola*, "of which it may prove to be only a variety." A curious new genus allied to Helvella is characterized under the name of Underwoodia, in honor of Professor L. M. Underwood, who communicated the specimens. The single species (*U. columnaris*) is a columnar, horn-shaped "receptacle," from four to six inches in height.

Among the "remarks and observations" the author says of the entire-leaved variety of *Rhus toxicodendron*, that "it has been reported to me as comparatively harmless so far as poisonous quality is concerned, and my experience in handling it was entirely without harm."—CHARLES E. BESSEY.

How to Know Grasses by Their Leaves.—Professor McAlpine, of Edinburgh, has written a useful little book of ninety-two pages upon the topic given above, intending it to be a simple guide to the identification of the common grasses by their leaves alone. For the practical man who wishes to know what grass is growing in his meadows and pastures this book will prove of great value; and even to the botanist it will often be quite useful. The author says in his introduction: "If farmers, clergymen, schoolmasters, and botanists use this method of identification a flood of light will be thrown upon many questions at present involved in obscurity, and the agricultural community will assuredly be greatly benefited.

In the treatment of the subject fourteen "groups" of grasses are defined as follows:

I. Characteristically colored grasses.
II. Variegated grasses.
III. Bulbous grasses.
IV. Cord-rooted grasses.
V. Acute-sheathed grasses.
VI. Net-sheathed grasses.
VII. Bitter-tasted grasses.
VIII. Bristle-bladed grasses.
IX. Hard-bladed grasses.
X. Hairy grasses.
XI. Eared grasses.
XII. Ribless-bladed grasses, with median lines.
XIII. Hairless grasses, with very low and flat ribs.
XIV. Ribs high and prominent, rounded, or acute.

Many good figures are given, thus greatly aiding the student. An admirable feature of the figures is the frequency with which cross-sections of leaves are given. Ligules and leaf-tips are also freely figured. The work, although written for England, will be useful in this country.—CHARLES E. BESSEY.